

PEST TECHNOLOGY

Pest Control and Pesticides

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'Ware the Witch Hunt!

IN our February issue we offered a plea for public relations in the Pesticide Industry "To counteract any possible wrong impression which may be gained by the public," and added, "In this way, the industry is safeguarding and insuring itself against any possible misinformed public opinion."

On the 20th May on the occasion of the annual dinner of the Association of British Manufacturers of Agricultural Chemicals, the Chairman, Mr. George Huckle, stated that the Association had proposed to the Ministry of Agriculture that an approved testing station should be set up in this country and said, "This we feel, cannot help but be of benefit to the farming community, and would do much to discourage the scandalous, anti-chemical campaigns with which we are frequently harassed and which do so much harm by hindering agricultural production in this country."

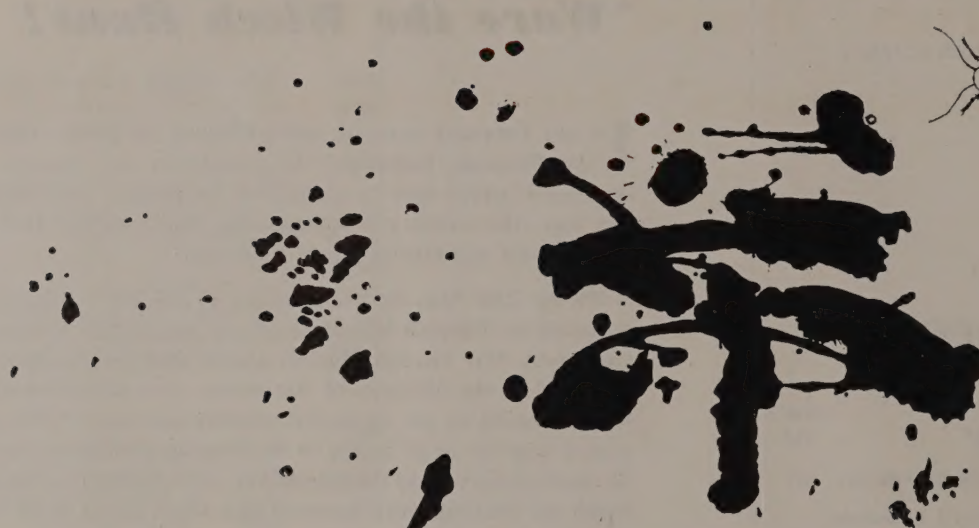
We claim no connection between the two statements except that we believe that they both indicate the necessity for some means of putting into their true perspective various outcries against pesticides.

In the U.S.A. literature is published frequently to publicise the benefits bestowed by pesticides and to reassure the public of the precautions taken to ensure public safety. In this short space it is impossible to review this literature but interested parties on both sides would do no harm in reading the "Open Door to Plenty" published by the National Agricultural Chemicals Association, 1145, 19th Street N.W., Washington 6, D.C. and obtainable free on request. There is also an excellent article by Dr. George Decker in the "N.A.C. News and Pesticide Review," Vol. 17, No. 4, obtainable from the same address.

Perhaps the greatest concern is shown by the wildlife enthusiasts and to be quite fair there may have been some basis for their concern. However, the incidents they pick out are misleading and exaggerated when one considers the situation as a whole; profound fears that the large-scale use of modern pesticides would seriously upset the balance of nature and result in disastrous losses in wildlife have not been realised. Indeed it has been stated that the impartial observer may be pardoned if he considers the loss of a few song birds, attributable to the spray of elm trees, less harmful than the permanent loss of such trees with the accompanying disappearance of nest sites.

To those who cry that the "balance" of nature is being disturbed we ask: was there ever a time when the "balance" of nature was at equilibrium and is it not true that Mother Nature with her ice ages, earthquakes, fires, floods and frost, has disturbed the "balance" to a far greater extent than man in all of his phylogeny?

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FISONS

PEST

CONTROL

British Wood Preserving Associations' Convention — 1959

The Minister of Agriculture, Fisheries and Food, the Rt. Hon. John Hare, O.B.E., M.P., has stressed that energy and enterprise will be required in the Home Timber Trade. The activities of the British Wood Preserving Association indicate that they will not be left at the post.

THE British Wood Preserving Association's plans for its 1959 Convention appear to be comprehensive and delegates who attend are assured of hearing papers which will provoke lively discussion and controversy. After all, the yardstick of any Convention is stimulation of thought and endeavour and a controversial subject is one which pre-supposes this stimulation of thought.

The Association can congratulate itself on having a good Convention Committee, the Chairman of which is E. H. B. Boulton. Conventions of this nature do not "just happen" and "Pest Technology, Pest Control and Pesticides" would like to take this opportunity of paying a tribute to those people who labour so long in an Honorary capacity to produce Conventions such as this: Conventions which are up-to-date in subject, virile in outlook and active in day-to-day affairs.

This year's Convention is being held at Cambridge University from Tuesday, 30th June to Friday, 3rd July. The first official session will be held in the University Lecture Rooms, Arts School, Benet Street, at 9-30 a.m. on Wednesday, 1st July. On Tuesday, 30th June delegates will assemble for dinner in college. Official meetings will continue throughout the days of Wednesday and Thursday, 1st and 2nd July, and the Convention will end after breakfast on the morning of 3rd July.

On the evening of Tuesday, 30th June, there will be an informal reception for all delegates to be held in the Hall of Pembroke College from 9-0 p.m., to 10-30 p.m. Light Refreshments will be served. On Wednesday, 1st July, an informal Garden Party is scheduled at the Garden House Hotel, 4-30 p.m. to 6-0 p.m.

The official Reception and Dinner will be held at the Dorothy Restaurant, Sidney Street, at 7-30 p.m. for 8-0 p.m. Dinner jackets will be worn at this function.

Accommodation has been reserved in Clare and Pembroke Colleges.

The following is a list of papers to be presented:-

"Further Studies in the Composition of Wood Preserving Creosote" by Dr. McNeil (Director of the Coal Tar Research Association).

"The Influence of Soft-Rot on Susceptibility of Beech to attack by the Common Furniture Beetle, *Anobium punctatum*," by Mr. J. D. Bletchly (Forest Products Research Laboratory).

A paper dealing with the fine structure of wood leading up to and including the observations made in the last few years on timber preservation, by Professor Preston (Department of Botany, Leeds University).

"The American Wood-Preservers' Association and Some Recent Developments in the Wood Preserving Industry," by Mr. J. M. Curd (Vice-President of the A.W.P.A. and Vice-President of Timber Preservers Ltd., British Columbia).

A paper dealing with forest pests and fungi and relating these to timber in use, by Mr. E. H. B. Boulton (Managing Director of Pesticure Limited).

A paper dealing with the use of borates in timber preservation by Mr. D. R. Carr (Borax Consolidated Limited).

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MEMBERS OF THE BRITISH WOOD PRESERVING ASSOCIATION

The summary of Papers will be presented by Mr. C. E. Carey on the afternoon of Thursday, 2nd July. On this same afternoon there will also be a Brains Trust on timber preservation generally.

The British Wood Preserving Association's up-to-date conventions and virile outlook appear to be justified in view of the speech delivered at the luncheon of the Federated Home Timber Association on the 6th May, by the Minister of Agriculture, Fisheries and Food, the Rt. Hon. John Hare, O.B.E., M.P., who said:-

"The home timber trade has many problems and I know that things have been difficult this last year. The cuts in purchases by the National Coal Board came, I know, as something of a shock. Although they fell more on imports than on home supplies I do realise that they caused some people a good deal of hardship. I am very glad that things are now a great deal more promising. The Coal Board, as you know, have reassured the Forestry Commission that their policy of buying as much suitable home-grown pitwood as possible remains unchanged. They hope soon to be buying as much again as usual. I think indeed that buyers generally are showing more interest in home-grown timber now, and that it is not too optimistic to look forward to a more prosperous year ahead.

"The Government have every confidence in the future of forestry in this country and therefore in the future of the home timber trade. We would not continue to invest so much in planting if we were not satisfied that there will continue to be a market for home-grown timber. I think that the measures I announced last July should enable the trade as well as woodland owners to plan ahead in full confidence.

"But, of course, in the last resort you will only be confident if you share my view that home-grown timber will always find its markets. I think we have to face the fact that those markets will not necessarily be the same as in the past. But I am quite convinced that with energy and enterprise we can find new markets to take the place of the old. For every substitute that is found for timber there seems to be a new use discovered as well. The wagon trade may be lost; but there is the great development of pallets and stillages for mechanical handling. The traditional wood box may be gradually displaced by the fibre packing case; but that fibre itself is largely derived from timber. The same is true of the hardboard flush door. I was most interested, too, to hear of the experimental building made of softwood thinnings at Brandon, and of the thinnings house at Bexley. These may be but the first stages of far reaching developments. Of course, these readjustments may be painful. But I am quite sure they can be made and that the home industry will not only survive them but find in them the road to a new prosperity.

AGRICULTURAL AVIATION

By I. GREENFIELD, B.Sc. (Agric.), (*Agricultural Adviser to F. W. Berk and Co. Ltd.*)

Introduction

THE AERIAL APPLICATION of chemicals to crops in the U.S.A., Australia, South America, New Zealand and other countries has been established for a number of years. The current position in the United States is that some 1,500 operators using approximately 5,000 aircraft, often employing more than 10,000 pilots and mechanics, treat nearly a million acres of agricultural land from the air each year. Some 400,000 tons of dry chemicals and 90 million gallons of liquid are applied annually and it is safe to assume that aerial crop protection is an established part of both agriculture and horticulture in America and the other countries mentioned. These figures are not necessarily as startling as they may first appear when it is realised that some 200-400 acres of crops may be treated in a day and that between ten and twelve times the amount of chemical applied from a ground machine may be applied to crops from the air in one hour.

In Britain, it was not until 1947 that potatoes were sprayed from the air and it is interesting to record that last year some 120,000 acres of potatoes were sprayed by means of aircraft for the control of Potato Blight as compared with approximately one sixth of this acreage in 1950. During the last two years the development of aerial application of agricultural chemicals has proceeded at a considerable pace resulting in a time lag with respect to perfection of technique concerning both materials and methods of application. It is essential to be aware of this problem and the agricultural pilots of leading

companies in this field receive intensive training which includes instruction in the basic principles of crop protection.

The pilot of an agricultural aeroplane must have some appreciation of the end which he is endeavouring to obtain, and sufficient understanding to know whether he is applying the right chemical, at the right time, to the right crop, at the right stage of growth. He must also be an experienced and skilful flyer, able to avoid both agricultural and non-agricultural obstructions.

Most progressive farmers are in favour of aerial application providing it does a job equal to, or better than, ground application, preferably at lower cost. In addition, it may partly relieve him of the necessity for maintaining men and machines, a number of which carry heavy overheads and often stand idle for many months of the year.

The scope of agricultural aviation

Although potatoes are the most important crop which has already been treated from the air in this country, crops such as sugar beet, peas, beans, cereals, pasture and marginal grassland have all received aerial applications of crop protection chemicals and fertilisers. Limited commercial trials and experiments have also been made on apples, cherries, walnuts, hops, blackcurrants, raspberries, and willows. In view of the large and dense leaf area involved, the aerial spraying of some horticultural crops, particularly apples and hops should, at this stage at least, be looked upon as an additional application method and not as a replacement for ground spraying machinery. It is not always possible to effect the necessary penetration of foliage from the air, particularly at advanced stages of crop growth, but excellent top cover, which is frequently difficult to achieve from the ground, can be obtained. Under conditions which preclude the use of ground machinery, and when biological conditions indicate that spraying must be carried out, the use of aircraft is the only answer.

The advantages of aerial spraying with respect to fruit are as follows: it is quick; often some 300 acres can be treated in a day. When wet soil conditions prohibit the use of ground machinery or when foliage is dense, the trees are tall and difficult to reach from the ground, aerial spraying may be the only means of applying a chemical at the right time in the right place. Coverage obtained with sprays and dusts is more complete than is generally supposed due to the effect of turbulence created by the downwash of air from the wings together with the effect



Photograph showing Tiger-moth fitted with spray boom bearing the jets. Suitable for spraying most agricultural and horticultural crops.

of gravity, which assists both penetration and lateral spread of both droplets and particles.

On a wide variety of agricultural crops, including potatoes, aerial application can replace ground application methods with at least equivalent and, quite often, better results.

The importance of formulation

The active ingredient to be applied may be formulated as a dust, dispersible powder solution, or in oil and, contrary to general belief, both dispersible powders suspended in water, and oil formulations, can be applied through boom type sprayers.

The application of small amounts of chemical, often 2-5 lbs. of a dispersible powder in between 2-5 gallons of water per acre, makes it essential to use formulations possessing high wetting and dispersing characteristics at these concentrations.

The product must be non-corrosive, easy to mix without frothing and, more important, it must be carefully compounded as the method of manufacture affects particle size, viscosity, and density, all of which are related to droplet size, which in turn affects drift, leaf coverage, and the biological efficiency of the material.

Recent work in the United States described by Dr. R. Beatty at the British Weed Control Conference at Brighton has shown that an invert emulsion produces a spray with a higher viscosity which results in a greater proportion of droplets of uniform size, and few either small or light enough to be subject to drift.

Particle and droplet size

Unfortunately, misconceptions as to the meaning of these terms have resulted in the promotion of many false statements. Droplets should be as near as possible of a uniform size, not too small otherwise they will tend to drift, and not too large or they will not effect a complete cover of the crop which is being sprayed. The desirable

average droplet diameter for most agricultural and horticultural sprays should lie between 50 and 200 microns. However, it should be remembered that these figures represent the average, 50% of the droplets being larger and 50% being smaller than either 50, 200, or intermediate micron diameters. Apart from being the correct size, droplets must also be evenly distributed in order to effect a uniform coverage and hence adequate disease or pest control.

Insufficient importance is often attached to the fact that susceptibility to drift increases rapidly as the particles or droplets become smaller and that, in addition, they are subject to the interaction of effects such as evaporation, upward loss due to convection currents, and the collection efficiency of the foliage.

Present aircraft spray equipment cannot produce droplets of uniform size; therefore, the median droplet diameter is used as an index of the relative fineness or coarseness of the spray. In choosing the proper median droplet size for the treatment of a specific crop, the following should be considered:

1. Chemical and formulation.
2. Possible loss due to drift and convection currents.
3. Possible loss due to evaporation.
4. Collection efficiency and area of leaf.
5. Desired spray coverage.

These five factors should be balanced against each other in determining a droplet size that will give the optimum application rate in terms of gallons per acre. In the future it is probable that increasing emphasis will be placed on the determination of spray coverage in terms of droplets per unit leaf area. Assessment of droplet size and coverage by visual methods may be misleading as frequently many of the smaller droplets cannot be detected by eye, therefore determination of these effects must be made by physical and chemical methods.

Helicopter and fixed wing aircraft

There is always the temptation to think that the helicopter, particularly in view of the downwash from its rotors, is best fitted to meet the requirements of aerial application. It has been shown, however, that an equally effective downwash and under-leaf spray coverage can be obtained from fixed wing aircraft provided that they have a low wing and can be flown a few feet above the crop or trees. There are other disadvantages to helicopters—their high initial cost, which may be five or six times that of equivalent fixed wing aircraft, and operating costs usually up to ten times greater than those of aeroplanes capable of carrying comparable loads. The intricate machinery of helicopters needs to be frequently overhauled and their inability to carry large loads swings the balance in favour of fixed wing aircraft where simple maintenance and comparatively large loads are important if an aeroplane is to fly continuously throughout the day.



Photograph showing wind-driven pump.

Application

The method used to apply chemicals to crops must ensure that the material is distributed uniformly at a correct and constant rate per acre. Application is influenced by the type and design of the application equipment, and also by the ability of the pilot to fly accurately with or without markers, so that no part of the crop is left unsprayed. Other factors which affect application efficiency are atmospheric conditions such as wind and the height at which the aircraft may fly.

In this country the types of aerial application equipment most widely used are based on the boom and rotary atomiser systems. In America although the boom type apparatus is commonly used, there is a case for both types of equipment providing they can produce and maintain droplets of as near uniform mean particle diameter as possible, avoiding too high a proportion of "fines." The boom type equipment has an advantage in that a swath of uniform width is produced resulting in even ground cover. This system also allows for a greater degree of flexibility as factors such as flow pressure, nozzles, and nozzle positions can be easily altered to meet a wide range of conditions. The swath obtained from rotary atomiser equipment consists of two or four spirals of spray (depending upon whether two or four atomisers are fitted to the wing) which tend to roll together and meet in the wake of the aircraft. The proportion of fine droplets tends to be higher than with boom equipment and the evenness and coverage of the swath is greatly influenced by drift.

The application of solids, mainly fertilisers, from the air is a comparatively simple matter provided that if in powder form the material is free-flowing and not subject to caking. Pelleted and granular material is easier to handle and generally preferred. In both cases the application equipment should be easy to clean and maintain, and provide a wide and uniform swath.

However, the reclamation of marginal land offers considerable scope for the aerial application of lime, fertilisers and trace elements.

Some of the more important crops which will be treated from the air this year include the following.

The aerial spraying of potatoes for the control of Late Blight (*Phytophthora infestans*) is now established practice in much of the country. This year it is expected the acreage sprayed will increase and formulations based on various copper salts, alone and in combination with organo mercury salts, zineb, zineb/copper, and mercury/copper/zineb formulations will be widely used.

Crops such as peas, beans, sugar beet, market garden and vegetable crops will be sprayed with insecticides based on DDT, BHC, lindane and organo phosphorus compounds (where their use does not present a risk to



Spraying apple orchard out-of-season to obtain information on factors such as droplet ejection, drift, coverage etc.

livestock or human beings) for the control of a wide range of pests.

Grassland will receive applications of liming materials and top dressings, with complete fertilisers and supplements to correct any mineral deficiencies which may be present. Many cereals will be top dressed with quick-acting forms of nitrogen in the spring, and any diagnosed mineral deficiencies will be corrected by the application of the appropriate trace element. Some of these materials will be applied as solids, others as liquids. This year has seen the development of slug control from the air, particularly on crops such as winter wheat where this particular pest has been causing considerable havoc. Metaldehyde slug bait can be easily and quickly applied over a wide area without causing damage to the crop, and it is expected that this practice will increase rapidly on a wide variety of crops. In horticultural crops the acreage of apples sprayed is expected to be small compared with arable crops, but complementary aerial sprays of chemicals such as lime sulphur, wettable sulphur, organo mercury foliage fungicides, and captan, will be applied for the control of Apple Scab (*Venturia inaequalis*). Due to the considerable increase in Apple Mildew in most fruit-growing areas over the last few years, the use of sulphur and the inclusion of karathane in spray programmes will be widespread, and late application of fungicides for the control of *Gloeosporium* in July, August and September will no doubt be of considerable importance. Mixtures of these materials with acaricides and insecticides such as BHC, DDT, lindane, malathion, and other organo phosphorus compounds will be applied at some stages during the spraying programme for the control of a wide range of fruit pests.

Mineral deficiencies may be rapidly corrected by the aerial application of materials such as magnesium sulphate and chelated iron compounds for the correction of magnesium and lime-induced iron chlorosis at stages when it would be impracticable to use ground equipment, but where long term correction must come from adding these elements to the soil.

Powdery and Downy Mildew and pests (notably aphids) affecting hops will be controlled by the aerial application, once again together with ground machinery, of various copper, mercury/copper, and sulphur preparations in conjunction with organo phosphorus insecticides.

The productivity of vast expanses of this country can be significantly increased by the right managerial and fertiliser treatment. Much of this land is inaccessible from the ground and aerial applications of fertiliser can undoubtedly increase the stock-carrying capacity of these areas. Work in New Zealand has shown that in many instances the addition of large amounts of lime is not necessary for the improvement of much of this land and that small amounts of lime coupled with the seeding of legumes, plus fertiliser containing nitrogen, phosphate and potash, and any trace elements which are deficient, may bring about considerable improvements in a very short time. There are the other areas which support dense growths of bracken, couch and other undesirable vegetation which may be sprayed by weedkiller from the air, and subsequently improved also using aircraft.

The application of hormone or growth-regulating type weedkillers from the air is too risky to be carried out in the proximity of other growing crops. On extensive hill land areas where this risk is absent, providing droplet size is sufficiently coarse to avoid undue danger from drift, or an invert type of emulsion formulation is used, results may be quite satisfactory. However, and this applies to the application of all material from the air, it is the responsibility of the people concerned to see that weather conditions should be such that there is no danger of drift carrying materials on to susceptible crops which may be either damaged or made poisonous, if edible crops, to either human beings or stock. If danger of this type is suspected, spraying operations should be suspended until it has been ascertained that it is quite safe to continue. It will never be possible to apply material to some land or crops because of the proximity of a particularly sensitive crop.

This leads on to the whole question of the organisation of aerial spraying. All aerial spraying operations must be strictly controlled and require a ground organisation complete with radio links, tankers, and a supervisor who ensures with the pilot by means of maps that the right field is sprayed, markers are in position as and when required, and generally that the whole operation goes smoothly.

The future

What of the future of aerial spraying? Is it here to stay and develop or is it just a passing phase? There can be no question at all that the usefulness of aerial treatment has already established itself both in this country and abroad. In many countries the ravaging of crops by pests such as locusts can now be considerably

reduced by the aerial application of insecticides to both the airborne swarms and the breeding areas of these insects. This development has considerably increased agricultural productivity in areas where the ravages of the locust brought untold suffering in terms of starvation.

There can be no question that although aerial spraying has developed comparatively rapidly it will settle down to take its rightful place in world agriculture. Naturally, developments both with respect to machines, application machinery and crop protection chemicals will take place and more information will be obtained about problems such as drift and how it may be minimised without reducing the biological efficiency or coverage of the chemical used. It is forecast by some that the aerial sprayer of the future will consist of a platform which may hover or move forward at varying speeds upon cushions of air. This may seem far-fetched but machines have already been developed which work on this principle and it would require little modification to fit them for the aerial application of agricultural chemicals. A further possibility is the control of this type of spraying platform by means of remote control radio links. This method of control has been perfected and is widely used in aircraft and other airborne missiles today; it is therefore not beyond the bounds of possibility that it will eventually be used in the service of agriculture. In the field of application equipment, more is becoming known about the mechanics of droplet production, and better apparatus capable of producing even swaths of droplets having a more uniform diameter will be produced. This, coupled with greater knowledge of the minimum amounts of chemicals and their disposition on the fruit or foliage necessary for adequate biological control, could significantly raise the efficiency of present day aerial crop protection methods. The formulation of new and existing active ingredients will be greatly improved and as development of materials such as systemic fungicides becomes possible, the question of accurate placement may become of secondary importance to the coverage of foliage with the right amount of material necessary to make a particular plant fungicidal.

There is still much to be learnt about all facets of aerial agriculture but with the widespread development of this additional farming tool, research on inter-related problems in many countries will result in the resolution of some hitherto unanswered questions and additions to fundamental knowledge which will enable agricultural aviation to be used with greater economic efficiency on an ever-increasing scale. There can be little doubt that aerial agriculture is here to stay but it must be realised that there are still a great many problems to be resolved before this form of application can be of greatest benefit to the farming community throughout the world.

AERIAL SPRAYING *

by R. J. GUTSELL, N.D.H.

THE recent interest, i.e. over the past two-three years, in aerial application of crop protection products to crops in this country surely indicates the way in which those engaged in agriculture and horticulture view and approach the many problems with which they are confronted—careful consideration—tentative trial—just commencing to nibble—then a brief pause to consider the situation and into the job of employing the right tools for the job.

It is an essential part of the approach, to appreciate that aircraft either helicopter or fixed wing, fit in and do not replace conventional machinery for applying crop protection chemicals. Although for many operations they can replace existing machinery, the user must consider a range of factors: (a) suitability of crop for treatment, (b) whether a suitable formulated material is available, (c) if so is it free from hazard as regards its effect on the pilot and ground staff, (d) what is the drift hazard to man, beast and adjoining or nearby crops, (e) can a ground machine do the job as efficiently and economically as the aircraft.

There may be an affirmative or negative answer to these questions, but unless they all fit into a "safe and accepted pattern" then it would be better to still pause and consider the situation.

There is no doubt that aerial farming will develop rapidly. In the past many "set backs" occurred and progress was virtually non-existent.

However, engineering ingenuity overcame many of the problems connected with spray rigs, pumps, nozzle sizes and apertures, spray patterns and distribution of the spray material, and continued progress is certain.

The chemical manufacturing organisations have produced formulations specifically designed for aerial application.

At one time the development of aerial farming seemed to be related to obstacles—flying hazards—and at first the way out appeared to be—only operate in flat country where no obstacles interrupted level flying.

However with the development of more satisfactory types of helicopters, this "obstacle" appeared to have been overcome, but another arose—high initial cost of the machine and very heavy maintenance charges. Again progress overcame the obstacle and cheaper machines with correspondingly lower maintenance cost were developed which from operational details obtained during the past 2 years are equally as efficient as regards aerial application.

Before going on to the actual use of aerially applied crop protection materials "the ways and means" of doing the job should be considered.

Although there are only two types of aircraft, helicopters and fixed-wing, there are numerous types of spray rigs—adapted field machine spray booms designed "angle set" spray bars, specially designed atomisers etc. All these are claimed to have special features.

The "P.P." Machinery Department at Fernhurst have tested a number of these spray rigs and have been able to substantiate some of the claims put forward. In some instances improvements have been suggested following on the tests which in some cases have been very exhaustive to both apparatus and operator.

However, as a result a considerable amount of valuable information has been obtained and circulated to those concerned.

Experience at the moment under general English conditions of mixed farming indicates that Helicopter application of crop protection materials gives the better results. With the down draught effect of the rotor arms and the definite placing of the swathe, the drift hazard is greatly reduced and under many conditions virtually eliminated.

Experience in 1957 trials showed that helicopter spraying of field corners and head lands was relatively easy and spray particles were conveyed well down into and through the crop. Also a definite pre-determined swathe width could be maintained throughout the entire crop spraying operation.

A further important point was the small area needed to land the machine, consequently it was possible to operate for a longer number of actual spraying hours per day, as the time spent in flying from the operational area to the filling up touchdown point was very low.

As stated earlier development and progress continue together.

Weed control either in cereals or on grassland inaccessible to ground machines has been practised and some highly successful results have been obtained without any apparent damage to crops immediately surrounding the treated areas.

However in areas of intensive cropping such as the Eastern Counties aerial application of the existing "hormone" weedkillers cannot be recommended, although overseas work on reformulations suggest that by "inverting" the material and emulsifying, the drift hazard may be reduced to negligible proportions.

* Talk given at the Pertwee Meeting on "The Place of Aircraft in Agriculture"



*Pertwee Meeting held in Colchester on 24th March, 1959
"The Place of Aircraft in Agriculture."*

The Panel—G. Strickland, (Head of Technical Dept. Section, Fernhurst Research Station). J. S. W. Simonds, (Director, Frank Pertwee & Sons, Ltd.) R. J. Gutsell, (Development Officer, Messrs. Plant Protection Ltd.) C. M. Jarvis, (Chairman). S. Yates, (Manager of Pan Britannica Industries, Aviation Division). R. A. Powell, (Central Agricultural Control, I.C.I.) D. Gough, (General Manager, European Helicopters).

It may well be that within the next 5-6 years "safe" selective weedkillers for aerial application will be available.

In the practice of aerial farming, the farmer must appreciate, when considering the problem of the application of crop protection material, the "birds eye" view, and approach of the pilot of whatever aircraft is being used.

What are the main points:

1. The fullest utilisation of the aircraft—it is the number of hours spent actually applying the chemical which are of vital importance in economic aerial crop spraying.
2. Suitability of the individual field and of the immediate area adjoining i.e. freedom from flying hazards, clearness of area to be sprayed etc.
3. A product which can be satisfactorily sprayed from the air and which will produce good results.

Air spraying operators are like their ground counterparts—they like to know that the job has been well carried out and a satisfactory result obtained.

Having now surveyed the approach to the problem, consideration of crop protection materials—their use for specific purposes and rates of application must now be undertaken.

Referring to the crops possible for aircraft application a more detailed study of each will be made.

Potatoes are a very good subject for aerially applied crop protection methods, the evenness of growth, general location etc. greatly assist in providing an almost perfect target.

The object in all approaches to potato blight control is preventative. Regular protective coverings of fungicide are essential in periods of wet weather, dry conditions are not conducive to the spread of blight, but as the English weather can be decidedly fickle, growers are agreed upon a system of protective fungicidal leaf cover.

When employing ground equipment, the wet state of the ground frequently prevents the use of tractors and mounted or trailer spraying machines and thus an unprotected leaf period often ensues. With aerial application a continuous cover can be maintained and in addition there is no mechanical damage to the haulm and consequently crop reduction.

There are three programmes which can be advised:

1. Aerial Perenox all through.
2. "P.P." Zineb all through.
3. "P.P." Zineb until the final spray which should be Aerial Perenox.

Sugar Beet: Green aphids spread Virus Yellows. This should be engraved on all grower's minds. It is not possible to obtain complete control but a very high degree can be ensured, figures published by the British Sugar Corporation over the 3-4 years have proved this without a shadow of doubt. Work in East Anglia has shown that even in a wet year spraying against this pest and the subsequent control of virus infection has produced very worthwhile crop and sugar increase.

Ground machines can adequately deal with this pest provided the soil is in a suitable state for traversing the fields and weather conditions do not prevent spraying. However, it is highly probable that under certain conditions in some years farmers may require large acreages of beet to be sprayed within a very short period, e.g. a sudden hot spell causing aphids to migrate in great profusion from overwintering quarters to the commercial crop.

Metasystox at 12 fl. ozs. per acre has proved to give highly successful results.

If Black Aphid infestation has to be tackled in July and the foliage has become dense, damage may occur from wheeled vehicles, also soil conditions could prevent passage. As with Green Aphid, aerial application of Metasystox produces an excellent kill.

Beet for Seed: When a crop has to be sprayed for the control of black aphid, serious mechanical damage results when ground machines are used. Aerial application provides the perfect answer.

Metasystox as for the commercial crop should be used.

Cruciferous Seed Crops: Cabbage, mustard etc. are in a similar category as Beet Seed and should be treated accordingly with Gammalin 20 (Gamma BHC) Didimac 25 (DDT) or P.P. Dieldrin Miscible Liquid.

Peas again are a crop which suffer mechanical damage when sprayed by ground machines. Aerial application of crop protection materials to peas is related to the control of two major pests, aphids and moth (Maggot).

Aphid is satisfactorily controlled by using Metasystox at 12 fl. ozs. per acre before an infestation builds up, this is generally in early June and coincides with the appearance of the first flowers.

Didimac 25 (DDT) at 3 pints may also be used but Metasystox generally gives the better result. A second spraying may be necessary, if this is so it usually coincides with the *moth spray treatment*.

Moth—"Didimac" 25 at 6 pints per acre applied 7-10 days after the first flowers appear and repeated 14 days later for harvest peas, has given good results. However, it is essential to ensure satisfactory atomisation, otherwise there may be spotting of the pods and haulm if large droplets of the spray are allowed to fall on the crop. This does not generally cause any permanent harm but many growers object to seeing disfigurement of growing crops.

On the Continent, organo phosphorus Parathion (Fosferno 20) compounds are used and these give excellent results. In Holland particularly, the use of DDT for control of Pea Moth was given up some years ago and now Parathion is used for all pea crops.

Field Beans is a crop ideally suited for aerial application of insecticides. Ground machines cause damage, often severe and may produce conditions which allow the development of Chocolate Spot.

The main pest is Black Aphid. An infestation can seriously reduce the yield. Aerial application of Metasystox 12 fl. ozs. per acre when an infestation is building up will give an excellent kill.

Brassica Crops: Sprouts, cabbage etc. An application of an organo phosphorus systemic insecticide is advised for controlling this serious pest. Frequently a late build up occurs and the passage of ground machines could cause damage especially in the sprout crop—broken stem leaves are not conducive to the formation of good "buttons" therefore, an aerial application of Metasystox at 16 fl. ozs. per acre when necessary is the answer.

Aerial application of crop protection sprays to horticultural crops is in the development stage. Generally as the fruit spraying programme is so arranged aerial application does not as yet appear always to be convenient. Some of the systemic insecticidal sprays could be applied aerially and would no doubt be effective.

The value of aircraft at present is for the application of sprays late in the season when due to the weighing down of the branches by crop and foliage, passage through the orchard of ground machines is well nigh impossible.

At this stage the use of aircraft to apply Captan late sprays for controlling gloeosporium storage rots on the fruit is a commendable practice.

Satisfactory results on Hops for mildew control have been obtained in Kent using aerially applied cuprous oxide (Perenox) when ground conditions prevented the passage of ground machines.

Many acres were sprayed in 1958 with good results, this in a bad Downy Mildew year.

In all aerial applications of crop protection materials, the same precautions apply as in ground machine spraying. Metasystox must not be applied within 3 weeks of harvesting a crop and Fosferno 20 (Parathion) within 30 days.

Forward planning is essential to allow the organisation responsible to arrange its programme and to give all concerned a fair and reasonable chance of obtaining the best service available coupled with satisfactory results. Therefore by early booking (Reservation) the farmer is assured that the service is available to him at the correct time rather than leaving such an important matter to a last minute decision and chancing that there will be a vacancy.

In order to get the cost per acre down to an economic figure, the aircraft as explained earlier, must spend as much time as possible *spraying crops* and not just flying. Therefore, an early indication and where possible booking of the acreage to be treated, type of crop, variety etc. will go a long way to ensuring that "Farming from the Air" will continue to progress and become a highly successful integral part of British farming.

SUMMARY OF INFORMATION ARISING FROM QUESTIONS Fertilisers

1. Sulphate of Ammonia applied from the air does not give a good distribution pattern. It could be pelleted or granulated but this would make it very expensive.
2. Pelleted Urea is more quickly dispersed into the soil than the normal granulated fertilisers.
3. Although there have been no actual trials on top dressing of brassicae especially kale, aerial top dressing should produce excellent results.
4. Trials at Jeollots Hill on foliar nutrients show that to obtain comparative results the equivalent amount of actual N.P.K. would have to be applied to obtain the same results.



Kolibrie Helicopter and Helicar, showing the small space required for servicing between applications.

Spraying

1. Helicopter spraying of orchards should only be done when the conventional ground machine cannot be used.
2. Helicopter application of sprays on potatoes must start early or alternatively ground machines must be used for the early sprays. You cannot expect to penetrate and effectively cover a potato crop if the first spray is applied by helicopter when the haulm is tall and dense.
3. March issue of *Agriculture* showed the satisfactory control of pea moth obtained by ultra low volumes. It is wholly a question of efficient coverage, this can be obtained by these special aircraft. On the Continent large acreages of peas are sprayed from the air with satisfactory results.

General

1. The Helicopter flying 2-4 feet above the crop and using comparatively large droplets plus the down draft from the rotor blades ensure efficient cover and penetration with no drifting of material.
2. Selective weedkillers will **not** be applied from the air in this area by any aerial Contractors with whom Messrs. F. Pertwee are concerned.
3. The human markers would be used for aerial top

dressing but for spraying the Continental system of markers, canes or posts would be used.

4. In order to put on ultra low volumes by ground machine special equipment would have to be designed and manufactured? This would have to be something like an inverted Autoblast and would be expensive. Crop dividers are useful but in many cases the crop becomes interlocked across the rows and in this case dividers would do much harm.

Summing up by Chairman and Mr. Gosling (farmer)

In this aspect of farming the English farmer is lagging behind the Continental and overseas farmer. This is basically wrong and we should do all we can to support and use these new techniques. It is up to the farmers to co-operate with the aircraft Contractor and Agricultural Merchant (whose prosperity lies with the prosperity of the farmer) to work together to regain the lead in aerial farming at this moment lost to overseas areas.

Early indication of requirements lead to smooth operations. Panic ordering leads to dissatisfaction and disturbance. It is up to the farmers to help themselves.

N. F. Pertwee in answering to the vote of thanks particularly stressed the great assistance given to the farming community on this particular new technique by Imperial Chemical Industries and their allied Companies.

THE OSPREY 'ACE'

is universal!



(1) Dusting can be easily regulated from a fine mesh to a heavy cloud by simple adjustment of the controls—which are within easy reach of the operator.

(2) Spraying is a simple job with the Osprey Ace—just switch it on or off with a simple thumb control lever. The dependable engine is rubber mounted to STOP vibration.

(3) Dust and spray mixtures—wettable powders—no premixing required. Or you can just introduce a slight amount of liquid into the dust stream sufficient to make it stick where it's wanted.



and FLAME THROWING if required

Osprey "ace"

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THE DORMAN SPRAYER CO., LTD.



NEWS

Over 200 Films for Free Hire

Industrial and commercial organisations with a story to tell are increasingly using 16 mm. films to do it. The new Sponsored Film Catalogue issued by the G.B. Film Library, Perivale, Middlesex — Europe's largest 16 mm. distribution organisation — gives details of over 200 films available for free hire, some suitable for technical instruction, and others of wider appeal.

Farming and the Food industries are represented by over 40 films dealing with a wide variety of subjects from wine-making in France to the control of vegetable pests in the market garden.

The catalogue is available free of charge on application to the Industrial Department, G.B. Film Library, Aintree Road, Perivale, Middlesex.

Extra Subsidy for Summer Liming

For agricultural lime delivered on the 11th May, and thereafter until further notice, the rate of subsidy will be increased from 60% to 70% of the farmer's costs of liming. This

will apply to the cost of spreading the lime as well as to the delivered cost, subject to the maximum spreading contribution payable. For Cornish sea sand the increased rate of 70% has applied since 4th April as already announced.

Farmers do not need to make any special application for the summer subsidy; when the usual claim is sent in, the increased rate of subsidy will be applied.

Glen Creston Ltd., of 41 Church Road, Stanmore, Middlesex, are to market two pieces of laboratory equipment new to this country.

One is the Micro Mixer Mill for extremely rapid disintegration and mixing of minute quantities of substances to ultra-fine particle size. The grinding and mixing is carried out in stoppered vials of 2 or 5 c.c. capacity, made of plastic, stainless steel, hardened tool steel or agate. The size of the vials and the fact that they are completely closed during operation ensures that even the smallest quantities can be ground and mixed without any losses and there is no risk of contamination. The large choice of vials of different materials is of particular value where even microscopically small traces of abraded contaminants from the grinding tools have to be considered.

The grinding speed is very fast: materials can be pulverized to less than 200 mesh in 2-3 minutes.

The mill can be used in many branches of science and industry. Apart from such specialised fields as electron microscopy, infra-red spectroscopy, x-ray diffraction studies, powder metallurgy, the mill is an extremely useful analytical and research tool in chemical and medical laboratories, with applications in biochemistry, agriculture and horticultural research, food investigation, etc.

The price has been set so low that the unit is brought within the reach of most laboratories. The simplest outfit costs only £37.

The other equipment, simultaneously introduced, is the Sample Mixer Mill which basically serves the same purpose, but is capable of coping with very much larger quantities.

H. E. Helman & Co. (Insecticides) Ltd., have moved to their new factory and offices to which all communications should now be sent. The address is 10.22 Bank Street, Gravesend, Kent. The company also announce that they have appointed Messrs. Gottfred J. Christensen of Oslo as distribution agents for Norway, Messrs. Franco-Suisse for France, Messrs. Stephen & Co. for Hongkong and Messrs. Haver Lockhart Laboratories of Kansas for the U.S.A.

H. E. Helman & Co. (Insecticides) Ltd., have produced a chemical formulation to be marketed under the trade name of "Firm-Foot," which, it is claimed, is both a preventative and curative for Foot-rot in sheep.

As a preventative it is only necessary to spray round each foot liberally and as a curative the same action is necessary but the foot should be opened as wide as possible and well sprayed between the claws.

The manufacturers claim that it is effective for approximately six weeks and that only in the case of a severe attack is it necessary to pare the feet.

"Firm-Foot" will be packed in 6 oz., Aerosols, $\frac{1}{2}$, $\frac{1}{4}$ and gallon cans and can be applied by any reliable piece of spraying equipment, such as the Dron-Wal.



Application of "Firm-foot."

NEWS

New Fertiliser Plant

His Grace the Duke of Northumberland, Chairman of the Agricultural Research Council, opened Shell Chemical Company's new Fertiliser Plant at Shell Haven, Stanford-le-Hope, Essex on 22nd May. The plant, which will cost over £6½-million, has a capacity of 75,000 tons of ammonia a year. Later this year, when all units are complete, the nitrogenous fertiliser "Nitra-Shell" hitherto imported from associates in Holland, will be available for the U.K. market. "Nitra-Shell" is a granular nitrogenous fertiliser with a guaranteed nitrogen content of 23% and 31% carbonate of lime, which makes it the most concentrated nitrogenous granular fertiliser available in this country.

In his speech the Duke of Northumberland emphasised the rise in farm output which has taken place in recent years and the important part which fertilisers have played in this expansion. The Agricultural Research Council, he said, was conscious of the valuable contribution being made by commercial enterprise and welcomed every opportunity for collaboration between state-financed research centres and those of private enterprise.

After stressing the importance of our grasslands, the Duke welcomed the fact that Shell Chemical Company were going to sponsor a National Grassland Demonstration on June 8th and 9th, 1960, to be opened by Lord Netherthorpe, Chairman of the N.F.U.

The Duke's address was preceded by that of Mr. F. A. C. Guepin, Chairman of Shell Chemical Company and a Managing Director of the Royal Dutch Shell Group, who pointed out that the present population of the world would have been doubled by the year 2000—a fact which underlined the challenge to research and increased food production. Science and technology as applied to agriculture could do a great deal to fill the gap.

BP's First Fifty Years

Fifty years ago, on 14th April, 1909, The British Petroleum Company was founded under its original name of Anglo-Persian Oil Company.

The Anglo-Persian Oil Company was formed in consequence of the first discovery of oil in the Middle East: a year previously—on 26th May, 1908—oil in commercial quantities had been struck at Masjid-i-Sulaiman in South Persia. This discovery came seven years after the Persian Government's grant of a concession in 1901 to William Knox D'Arcy, a Devon man who had made a fortune from gold mining in Australia.

The Anglo-Persian Oil Company was formed in 1909 to operate the D'Arcy concession. Since then, the Company and its associates have grown into a world-wide organisation, with interests in all aspects of the oil industry. The name was changed to Anglo-Iranian Oil Company in 1935 and to The British Petroleum Company in 1954.

To commemorate BP's first fifty years, a dinner was held at which the speakers were the Chancellor of the Exchequer, the Rt. Hon. Derick Heathcoat Amory, M.P., Lord Birkett and Sir Neville Gass, BP's Chairman.

A history of the Company, entitled "Adventure in Oil: the Story of British Petroleum" has been written by Mr. Henry Longhurst and is published by Messrs. Sidgwick & Jackson Ltd. The foreword is by Sir Winston Churchill.

The Company has produced a pictorial history, "BP, Fifty Years in Pictures," primarily for the staffs of companies in the BP Group; but a limited number of copies are available on application to BP's Information Department, Britannic House, Finsbury Circus, E.C.2.

European Agricultural Scientific Appointment

Cyanamid of Great Britain Ltd. announce that Dr. William M. McKay, M.R.C.V.S., has been appointed Agricultural Scientific Co-ordinator for the European Region of Cyanamid International.

Dr. McKay, Animal Health Adviser to Cyanamid of Great Britain Ltd. since 1956, will be responsible for the co-ordination of research and the collation and dissemination of resultant scientific information throughout and between experimental establishments in Europe, from Scandinavia to the Mediterranean. He will, however, still maintain his office in Bush House, Aldwych, London, W.C.2.



Picture shows a general view of the Shell Chemical Company Fertiliser Plant at Shell Haven. (A Shell Photograph—1959)

NEWS

Industrial Pest Control Association— New Officers

The Industrial Pest Control Association have announced the election of the following officers and executive committee for the year 1959-60: *President*: Mr. D. J. S. Hartt, May & Baker Ltd.; *vice-president*: Mr. G. A. Campbell, The Geigy Co. Ltd.; *hon. treasurer*: Mr. S. Farrow, London Fumigation Co. Ltd.; *hon. auditors*: Mr. W. H. Comerford, Ratbane Ltd.; and Mr. S. Egleton, Verminex Ltd. The executive committee consists of Mr. D. Boocock, Mr. S. W. Hedgcock, Mr. C. A. E. Stuart Kregor, Mr. D. M. Simpson, Mr. H. D. H. Womack. The immediate past president is Mr. A. Fraser McIntosh of Thomas Harley Ltd. The secretary is Mr. W. A. Williams.

Horticultural Marketing Advisory Council

At their meeting on 13th May, 1959, the Horticultural Marketing Advisory Council unanimously agreed to recommend the setting up of a permanent Council to be financed eventually by the horticultural industry itself. The Advisory Council further recommended that during an initial period of say two years from its formation, as proposed by the Runciman Committee the necessary finance should be provided for the permanent Council from public funds.

The Advisory Council have submitted to the Minister of Agriculture, Fisheries and Food a memorandum containing tentative proposals on the functions, constitution, and method of financing a permanent Council, to serve as a basis for direct consultation between the Ministry and the interests concerned. In the opinion of the Council such consultation should include further study of arrangements for collection of the Council's revenue by wholesalers and of the position of home producers if they should wish to promote publicity for British produce financed by levy under arrangements suggested by the Advisory Council in its memorandum.



Patrick L. Burgin (right) of the British Ratin Co., Ltd. chats to Mr. Miles Price, former managing director of Insecta Laboratories Ltd. and now technical director of Disinfestation Ltd. This picture was taken at the first national Pest Control Conference of the British Ratin Group, May 8th and 9th.

Pest Control Conference, Brighton

The first national Pest Control Conference of the British Ratin Group was held at the Grand Hotel, Brighton, on 8th and 9th May. The object of the Conference was to unify the efforts of the various companies which now comprise the most comprehensive pest control undertaking of its kind in the country.

In his speech at the opening session of the Conference, Patrick L. Burgin, Chairman of the British Ratin Co. Ltd., announced that the whole of the issued share capital of Insecta Laboratories Ltd. had been acquired. Mr. Miles Price, B.Sc., A.R.C.Sc., former Managing Director of Insecta, now becomes Technical Director of Disinfestation Ltd. Before forming his own company in 1948, Mr. Price was for ten years a research entomologist with I.C.I., being one of a team which developed BHC.

This is the latest merger with the British Ratin Co. Ltd., which over the past few years has included the acquisition of Chelsea Insecticides Ltd. (now called Disinfestation Ltd.) Rentokil Ltd., Woodworm & Dry Rot Control Ltd., Fumigation Services Ltd., and the formation of the Mi-Dox Company which markets fruit sprays, sprayers and graders. The Group also includes the Irish

Ratin Co. Ltd. and Irish Rentokil Ltd.

Nearly two hundred directors, executives and salesmen were present at the Pest Control Conference, which was also attended by directors and executives of Sophus Berendsen A/S., Bakteriologisk Laboratorium Ratin, Nederlandsche Ratin Mij, N.V., Ratin Belge and Laboratorio Italiano Battereriologica.

Among the films and film strips shown was a new colour film of the British Ratin Group's modern laboratories at Felcourt, East Grinstead, Sussex. Another new film showed how Disinfestation Ltd. deals with a variety of pest problems.

The Conference consisted of business sessions on the Friday morning and afternoon, a Civic Reception by the Mayor of Brighton at the Royal Pavilion on the Friday evening, another business session on the Saturday morning, and a banquet on the Saturday evening.

At the banquet a presentation of an engraved gold wrist-watch was made to Frank Stanway, Sheffield District Manager, for 25 years loyal service. Mr. Stanway said: "Some of the largest contracts I obtained for the company were in 1942-1943, and those contracts are still with us today."

NEWS — Farm Services

As the Ministry of Agriculture, Fisheries and Food ceased to service farms for the control of rats and mice on the 31st March, 1959, the Industrial Pest Control Association have issued the following names and addresses of members of the Association with services available for the treatment of rats and mice on farms:

Northern Region* (*Cumberland, Durham, Northumberland, Westmorland, Yorkshire (N. Riding)*).

Disinfestation Ltd.,
28 Lowther Street,
Carlisle, Cumberland.
Tel. No. Carlisle 22133.

(*Cumberland, Westmorland*)

Disinfestation Ltd.,
90 Pilgrim Street,
Newcastle on Tyne, 1.
Tel. No. Newcastle 21848.

(*Durham, Northumberland, N. R. Yorkshire*)

Insecta Laboratories Ltd.,
Camden House, Camden Terrace,
Woodhouse Lane, Leeds, 2.
Tel. No. Leeds 33644.

Insecta Laboratories Ltd.,
23 Ridley Place,
Newcastle on Tyne.
Tel. No. Newcastle on Tyne 25311

Ratsouris Ltd.,
Milburn House,
Newcastle on Tyne, 1.

(*Westmorland, Cumberland, Durham, Northumberland*)

Scientex (Tyneside) Ltd.,
Templetown, Tyne Dock,
Southshields, Co. Durham.
Tel. No. St. Hilda 4921.

Yorkshire Fumigation Services Ltd.,
Rods Mills,
Morley, Yorkshire.
Tel. No. Morley 119 and 719.

(*N.R. Yorkshire*)

Yorkshire/Lancashire Region* (*Lancashire, Yorkshire (E. Riding), Yorkshire (W. Riding)*)

Disinfestation Ltd.,
2 St. John Street, Manchester, 3.
Tel. No. Deansgate 2102/4.

(*Lancashire*)

Disinfestation Ltd.,
10 Camden Place, Preston, Lancs.
Tel. No. Preston 5355.

(*Lancashire*)

Disinfestation Ltd.,
103B, Beverley Road,
Hull, Yorkshire.
Tel. No. Hull 32711.

(*E.R. Yorkshire*)

Disinfestation Ltd.,

7, Boar Lane, Leeds.
Tel. No. Leeds 30787/8.

(*W.R. Yorkshire*)

Disinfestation Ltd.,
83 Derby Road, Nottingham.
Tel. No. Notts. 44833.

(*W.R. Yorkshire*)

W. Edmunds & Co. Ltd.,
330 Lightbowne Road,
New Moston, Manchester, 10.
Tel. No. Failsworth 3261.

Hivey Fumigation Co. Ltd.,
311 Grafton Street, Liverpool, 8.
Tel. No. Royal 6631/2.

(*Lancashire*)

Insecta Laboratories Ltd.,
Camden House, Camden Terrace,
Woodhouse Lane, Leeds, 2.
Tel. No. Leeds 33644.

Insecta Laboratories Ltd.,
15 Paradise Street, Liverpool, 1.
Tel. No. Royal 1668.

Insecta Laboratories Ltd.,
79 London Road, Manchester.
Tel. No. Ardwick 5614.

Ratsouris Ltd.,
26 Victoria Street, Manchester, 3.
Tel. No. Stepping Hill 5030.

(*Lancashire, W.R. Yorkshire*)

Ratsouris Ltd.,
Milburn House,
Newcastle on Tyne, 1.

(*E.R. Yorkshire*)

Scientex Ltd.,
Halifax House, 97, Bridge Street,
Manchester, 3.
Tel. No. Deansgate 7092.

Yorkshire Fumigation Services Ltd.,
Rods Mills, Morley, Yorkshire.
Tel. No. Morley 119 and 719.

East Midland Region* (*Derbyshire, Leicester, Lincs. (Kesteven), Lincs. (Lindsey), Nottinghamshire, Northamptonshire, Rutland*).

Disinfestation Ltd.,
83 Derby Road, Nottingham.
Tel. No. Nottingham 44833.

(*Derby, Leicester, Lincs., Rutland, Nottinghamshire*)

Disinfestation Ltd.,
The White Building,
Fitzalan Square, Sheffield, 1.
Tel. No. Sheffield 23555.

(*Lincolnshire*)

Disinfestation Ltd.,
Station Place, Letchworth, Herts.
Tel. No. Letchworth 576.

(*Northants.*)

Insecta Laboratories Ltd.,
70A Hamstead Road,

Birmingham, 19.

Tel. No. Northern 4036.

Insecta Laboratories Ltd.,
79 London Road, Manchester.
Tel. No. Ardwick 5614.

Insecta Laboratories Ltd.,
Camden House, Camden Terrace,
Woodhouse Lane, Leeds, 2.
Tel. No. Leeds 33644.

Ratsouris Ltd.,
112 Hamstead Road,
Birmingham, 20.

Tel. No. Northern 0976.
(*South Derby, Leicester*)

Ratsouris Ltd.,
26 Victoria Street, Manchester, 3.
Tel. No. Stepping Hill 5030.

(*North Derby*)

Ratsouris Ltd.,
Walden House,
Houghton, Huntingdon.
Tel. No. St. Ives (Hunts.) 3004.

(*Lincs. Northants., Rutland*)

South Beds. Pest Control,
59 High Street,
Meppershall, Bedfordshire.

(Messrs. Woodbine & Taylor)
Tel. No. Shefford 465.
(*Northants.*)

West Midland Region* (*Cheshire, Hereford, Shropshire, Staffs., Warwickshire, Worcestershire*)

Disinfestation Ltd.,
18 Cook Street,
Liverpool, 2, Lancs.
Tel. No. Liverpool 8922.

(*Cheshire*)

Disinfestation Ltd.,
6 Livery Street, Birmingham, 3.
Tel. No. Central 1097.

(*Hereford, Warwicks., Worcs.*)

Disinfestation Ltd.,
Copeland House, Copeland Street,
Stoke on Trent, Staffs.

Tel. No. Stoke on Trent 48838.
(*Shropshire, Staffs.*)

W. Edmonds & Co. Ltd.,
Suffolk House,
Suffolk Street, Birmingham, 1.
Tel. No. Midland 5391.

Hivey Fumigation Ltd.,
311 Grafton Street, Liverpool, 8.
Tel. No. Royal 6631/2.

(*Cheshire*)

Insecta Laboratories Ltd.,
70A Hamstead Road,
Birmingham, 19.
Tel. No. Northern 4036.

Insecta Laboratories Ltd.,
79 London Road, Manchester.
Tel. No. Ardwick 5614.

(*To be continued in July issue*).

NEWS AND FORTHCOMING EVENTS



C. Kenneth Horne

C. Kenneth Horne—Appointed to Ronuk Board of Directors

Just as well known in the business world for his successful activities as company director as he is to the general public for his television work and his brilliant radio series, "Much Binding in the Marsh" and "Beyond Our Ken," Mr. C. Kenneth Horne has now been appointed to the Ronuk Board of Directors.

Mr. Horne was associated for more than 27 years with The Triplex Safety Glass Company, where he served as Sales Director. He was Managing Director of British Industries Fair Limited and Joint Managing Director of the Chad Valley Toy Company.

With Ronuk Limited, Mr. Horne's special interest will lie particularly in marketing, where his long and varied experience make his advice of great value. He regards the new Ronuk ingredient, Ancrol, which imparts anti-slip properties to Ronuk Waxes, as a development of outstanding importance in the polishing world.

British Celanese Limited announce that they have now extended the range of chemicals which they offer

by including N-Methyl Acetamide at a minimum purity of 98.5%. This product has applications as a chemical intermediate, but it is of more particular interest in pharmaceuticals, e.g. as a solubilising agent for chloramphenicol.

Enquiries should be addressed to British Celanese Limited, Chemical Sales Department, 345 Foleshill Road, Coventry.

The 1st International Symposium on Aerosols organised by La Federation Europeene des Associations Aerosols will be held at the Maison de la Chimie, 28, Rue Saint-Dominique, Paris, on 26th June. The organisation is under the direction of the Comite Francais des Aerosols, 51, Rue Boursault, Paris (17).

PROGRAMME

9-15 (1) Welcome speech and the Introduction by Mr. C. Franck, President of C.F.A. (France).

9-30 (2) Problems of the Perfuming of Aerosols from the Physico-Chemical Point of View—by Dr. Witjens (Holland).

10-15 (3) Application of Aerosols in the Pharmaceutical Industry — by Mr. Briston, B.Sc., A.P.I.M. Inst. Pkg. (England).

11-00 (4) Method of Determination of the Granulometric Characteristics of Aerosol Sprays—by Mr. Pette, Ing., Chim. I.C.N. (France).

11-30 (5) Protective Varnishes — by Mr. Etienne, Ing. dipl. de l'Institut Philotechnique de Bruxelles (France).

15-00 (6) Possibilities of the Normalisation in the Aerosol Industry—by Mr. Tangermann, Dipl. Ing. (Germany).

16-00 (7) Open discussion on Propellents: (a) Various Propellents (Introduction)—by Mr. Lessenich, Dipl. Ing. (Germany). (b) General Discussion of the Particular Problems under the direction of Mr. Hirschburger (Switzerland).

—Mr. Lessenich, Dipl. Ing. (Germany) answers to questions concerning chlorofluorinated hydrocarbons.

—Dr. Kubler (Germany) answers to questions concerning vinyl chloride and methylene chloride.

—Prof. Dr. Haase (Germany) answers to questions concerning carbonic acid.

—Mr. Delmore (Switzerland) answers to questions concerning nitrogen.

—Mr. Schloss (Germany) answers to questions concerning butane-propane.

17-00 (8) Comments on the Developments of the Aerosol Industry in the U.S.A.—by an American expert. 20-15 Diner Dansant in the Pavillon Dauphine, Avenue Foch.

National Farm Management and Work Study Conference

A National Conference on Farm Management and Work Study is to be held at Oaken, near Wolverhampton on Thursday, 2nd July.

The Conference is being arranged by the Staffordshire Agricultural Productivity Committee, with the support of the Ministry of Agriculture, Imperial Chemical Industries Ltd., and the National Farmers' Union. It will be under the Chairmanship of Professor H. G. Sanders, Chief Scientific Adviser, Ministry of Agriculture. Mr. J. T. Stanford, Chairman of the Staffordshire Agricultural Productivity Committee, will be the Director.

The Conference will take place at the Bradshaws, Oaken. The Bradshaws is a 360 acre farm tenanted by Mr. Peter Smith, who has had five of the farm's enterprises work-studied by the Imperial Chemical Industries' Agricultural Work Study Unit.

The enterprises are pigs, wheat, turkeys, blackcurrants and the production of beef from grass, and they will be open to inspection during the Conference and on the farm walk.

The various aspects of work study will be the theme of the Conference. Speakers will include Mr. Arthur Jones, Chief Farm Management Advisory Officer, N.A.A.S., and Head of the Work Study Unit; Mr. Gordon Lugg, Head of the I.C.I. Agricultural Work Study Unit; Mr. H. Collison, General Secretary of the National Union of Agricultural Workers, and Mr. J. Rhys Thomas, Vice-President of the N.F.U.

Admission will be free and farmers who would like to attend the Conference should write for fuller details to Mr. S. H. Jerrett, Secretary, Staffordshire Agricultural Productivity Committee, Federation House, Stoke-on-Trent.

Publications Received

Advances in Pest Control Research Vol. II.

*Published by Interscience Publishers,
New York, London.*

A recommendation of this book to anyone who has read the first volume would be superfluous. Volume two contains such articles as: The Fluid Kinetics of Application of Pesticidal Chemicals, by R. P. Fraser, Imperial College of Science and Technology; Research Advances in Seed and Soil Treatment with Systematic and Non-systematic Insecticides, by H. T. Reynolds, University of California; Wool Digestion and Mothproofing; The Relation of Chemical Structure to Activity for the 2,4-D-Type Herbicide and Plant Growth Regulator; and others.

It would be very difficult to pick out any of the articles for special mention and one would be hesitant to do so on a merit basis. However, it may be felt that the article, "The Fluid Kinetics of Pesticide Application," by R. P. Fraser deserves notice because of the necessity for a comprehensive account of the developments in this field. The application of pesticides is of vital importance and needs more research, for which this article may prove a useful reference. This article is, of course, highly specialised but the following quote may well be noted, "In a spraying machine the most vital component, the spray nozzle or atomizer, may cost only a thousandth part of the cost of the whole machine, yet the performance of this small part is paramount in achieving the desired result and more and more importance will, of necessity, have to be given to it."

"The Spread of Insecticide Resistance in Pest Species" by A. W. A. Brown, University of Western Ontario, may be the first article to receive attention due to increasing concern with this problem.

In the preface the editor R. L. Metcalf states "It is hoped that by the encouragement of the presentation of personal viewpoints, 'Advances in Pest Control Research' will

become a stimulating vehicle for the fostering of new lines of research as well as a continuing reference work for the research worker, the teacher and the student." This hope will probably be fulfilled.

Annual Report of the Forest Insect and Disease Survey 1958

Published by the Canada Department of Agriculture.

Amongst the subject matter in this report are accounts of the varied and unusual weather conditions that prevailed in many sections of Canada and the resultant effects on insects diseases and general tree growth and vigour.

The report states that Spruce Budworm outbreak conditions in 1958 can be briefly summarised as marked reductions in eastern Canada and modest increases in central and western Canada.

Unusual numbers of colonies or large-scale larch sawfly outbreaks were mentioned in all regional reports and reference is made to the considerable defoliation caused by the forest tent caterpillar in the Prairie Provinces.

Other outstanding insect conditions in 1958 which were mentioned were: marked declines in large aspen tortrix outbreaks in Ontario, Manitoba and Saskatchewan; weevil damage in Christmas tree plantings in Southern Ontario; and the discovery of the balsam woolly aphid on amabilis and grand fir in and around Vancouver. There are also accounts of various diseases.

Span. Vol. 2, No. 1.

Published by the Shell Petroleum Co. Ltd.

A very attractive and informative publication concerned with Public Health and Agricultural News. Most readers would find all the articles interesting but perhaps the most striking is the article "Adaptation and its Relation to Resistance" in

which one or two well chosen photographs are more effective than reams of writing.

Land 5

Published by the Shell Chemical Co.

Similar to previous issues in that it is well produced and attractive. It is set out well and includes a number of delightful photographs. All in all it should make pleasant reading for the countryman.

Synopsis of the Species of Agromyzid Leaf Miners Described from North America (Diptera)

By Kenneth E. Frick, Published by the Smithsonian Institution, United States National Museum, Washington, D.C.

This publication is almost wholly of academic interest as may be gathered from the following extract taken from the introduction; "The objective of this paper is to lay a firm foundation upon which students of the agromyzid leaf miners may build."

Crop protection entomologists who are interested in leaf miners may find a place for this key amongst their reference books.

Other Publications received include: Scarab Beetles of the genus Bothynus in the United States (Coleoptera: Scarabaeidae)

By O. L. Cartwright. Published by The Smithsonian Institution, Washington, D.C.

Ichneumon-Flies of America North of Mexico: 1 Subfamily Metopiinae

By Henry and Marjorie Townes, Published by The Smithsonian Institution, Washington, D.C.

Small Pulp Mill Survey Economic Study United Kingdom

By Sandwell and Co. Ltd., Consulting Engineers, Vancouver. Published by Her Majesty's Stationery Office, price 4s.

Report of the Forest of Dean Committee, 1958.

Published by Her Majesty's Stationery Office.